

**REMARKS**

The June 3, 2002 Official Action has been carefully reviewed. In view of the amendments submitted herewith and the following remarks, favorable reconsideration and allowance of this application are respectfully requested. This amendment and request for reconsideration is being submitted together with a Request for Continued Examination.

**Status of the claims:**

The June 3, 2002 Official Action is based on examination of claims 1-7, 9, 10 and 31-40. Claims 1-7, 9, 10 and 31-40 remain rejected, or are newly rejected, under 35 U.S.C. §112, first paragraph, for alleged lack of enablement. Claims 9, 10, 31, 32, 34-38 and 40 remain rejected, or are newly rejected, under 35 U.S.C. §102(b) as allegedly anticipated by Knuth et al., U.S. Patent No. 5,057,424.

In accordance with the present amendment, claims 35-40 have been canceled and claims 1, 6, 9, 10, 31 and 32 have been amended. Claims 2-5, 7, 33 and 34 remain unchanged from the previously filed amendment.

Claim 1 is amended to call for a method for producing vanillin in cultured *Vanilla planifolia*, which comprises (a) providing a tissue culture of said *Vanilla planifolia*; and (b) supplementing the culture with a compound selected from the group consisting of malic acid, 3,4-dihydroxybenzaldehyde, a combination of malic acid and 3,4- dihydroxybenzaldehyde, or glycosylated lysozyme, in an amount effective to result in the vanillin production in the cultured *Vanilla planifolia*. Support for supplementing the culture with a combination of

malic acid and 3,4-dihydroxybenzaldehyde is found in the specification at page 24, lines 19-22 ("Proaldehyde at different concentrations was added to the medium, either alone or in combination with the following treatments: - malic acid (0.01-3.0%) . . .") and at page 25, lines 26-28 ("Adding proaldehyde for a few days, followed by addition of malic acid, was found to increase production of vanillin and vanillyl alcohol.").

Claim 6 has been amended to depend from claim 3, and to call for a method in which the culture is further supplemented with about 0.01 to about 5% by weight of a compound selected from the group consisting of succinic acid, oxaloacetic acid, citric acid and pyruvic acid. Support for the combination recited in amended claim 6 is found in the specification at page 25, lines 19-25 ("Malic acid was applied alone or in combination with the following: . . . citric acid; varying concentrations of . . . oxaloacetic acid (sodium salt); . . . pyruvic acid; . . . succinic acid . . .").

Claims 9 and 10 have been amended to call for *Vanilla planifolia* cells produced by the method of claim 1, wherein, at 15 days in culture, the cultured cells produce at least twice as much (or ten times as much) vanillin as cells cultured 15 days under equivalent conditions but which were not supplemented with the compounds. The limitation of 15 days post-culture supplementation recited in the amended claims may be found at page 25, lines 13-15 ("The culture was maintained for 1 to 15 days, then was extracted as described in Example 2. Results are shown in Table 6 in the following example.").

Claims 31 and 32 have been amended to call for a cell culture comprising *Vanilla planifolia* cells, supplemented with elicitors of vanillin synthesis selected from the group consisting of malic acid, 3,4-dihydroxybenzaldehyde, a combination of malic acid and 3,4-

dihydroxybenzaldehyde, and glycosylated lysozyme, wherein, at 15 days of culture, the cell culture produces at least twice as much (claim 31) or ten times as much (claim 32) vanillin as cells cultured 15 days under equivalent conditions but which were not supplemented with the elicitor. Support for the amendments to these claims may be found in the specification as set forth for the amendments to claims 1, 9 and 10.

Claims 35-40 have been canceled, upon the Applicants' determination that the subject matter of those claims is described in claims 31-34.

Applicants submit that the claims as amended are in condition for allowance. The rejections under 35 U.S.C. §112, first paragraph and §102(b) are respectfully traversed, for the reasons set forth below.

**Rejection under 35 U.S.C. §112, first paragraph:**

The claims stand rejected under 35 U.S.C. §112, first paragraph, for alleged lack of enablement. The examiner has taken the position that the specification does not enable practice of the invention in the scope covered by the claims. Applicants assert that the claims as presently amended are of a scope that is fully enabled by the specification. The claims now call for a method of producing vanillin in *V. planifolia* tissue cultures, and cells/cultures in accordance with the method, wherein the culture is supplemented with malic acid, 3,4-dihydroxybenzaldehyde, a combination of malic acid and 3,4-dihydroxybenzaldehyde, and glycosylated lysozyme. Further, if the cultures are supplemented with malic acid, additional supplementation with citric acid, pyruvic acid, oxaloacetic acid and succinic acid is called for. These particular culture supplementations and combinations are set forth specifically in

Examples 3 - 5 (page and line numbers listed above). Ranges of amounts of the supplements are also set forth in the Examples and elsewhere in the specification. Working examples are also provided, as the examiner has acknowledged. Thus, one skilled in the art would be fully enabled to practice a method of producing vanilla in *V. planifolia* tissue culture as claimed in claims 1-7, as well as to establish the cells and cell cultures of claims 9, 10 and 31-34, having the teachings of the present specification before him. Accordingly, the rejection under 35 U.S.C. §112, first paragraph, is not applicable to the claims as amended. Withdrawal of the rejection is requested.

**Rejection under 35 U.S.C. §102(b):**

Claims 9, 10 31, 32, 34-30 and 40 stand rejected under 35 U.S.C. §102(b) as allegedly anticipated by Knuth et al., U.S. Patent No. 5,057,424. Applicants assert that the subject matter of the amended claims is not identically disclosed by Knuth et al. The amended claims now call for a cell culture, or cultured cells, wherein, at 15 days following initiation of the supplementation, the cells or cultures produce at least twice as much vanillin as do cells or cultures not subjected to the supplementation. Knuth et al. nowhere disclose this limitation. Knuth et al. (column 15, lines 55-60) disclose a change in vanillin production *over time* (29-47 days), of 1.8 mg/L to 18 mg/L in cultured cells. Knuth et al. also disclose a solid culture step where the medium comprises 10 mg/L malic acid (column 13, line 53). However, Knuth et al. do not disclose cultured *V. planifolia* cells or cell cultures supplemented with one of malic acid, 3,4-dihydroxybenzaldehyde (or a combination of the two), or glycosylated lysozyme, that produce two to ten times as much vanillin at 15 days

following initiation of supplementation as do cells or cultures not supplemented with the compound. Accordingly, the disclosures of Knuth et al. cannot be said to anticipated the invention as presently claimed in claims 9, 10, 31 and 32. Therefore, withdrawal of the rejection is requested.

In view of the claim amendments submitted herewith and the foregoing remarks, the presently pending claims are believed to be in condition for allowance. Applicants respectfully request early and favorable reconsideration and withdrawal of the rejections set forth in the June 3, 2002 Official Action, and allowance of this application.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version with markings to show changes made."

Respectfully submitted,



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## VERSION WITH MARKINGS TO SHOW CHANGES MADE

The claims were amended as follows:

1. (Twice amended) A method for producing [improving production of] vanillin in cultured *Vanilla planifolia*, which comprises:

a) providing a tissue culture of said *Vanilla planifolia*; and

b) supplementing the culture with a compound selected from the group consisting of malic acid, 3,4-dihydroxybenzaldehyde, a combination of malic acid and 3,4-dihydroxybenzaldehyde [citric acid, pyruvic acid, oxaloacetic acid, succinic acid], and glycosylated lysozyme, [and any combination thereof], in an amount effective to result in [improve] the vanillin production in the cultured *Vanilla planifolia* [as compared with cultures not supplemented with the compound].

6. (Amended) The method of claim 3 [1], wherein the culture is further supplemented with about 0.01 to about 5% by weight of a compound selected from the group consisting of succinic acid, oxaloacetic acid, citric acid and pyruvic acid.

9. (Twice amended) Cultured *Vanilla planifolia* cells, produced by the method of claim 1, wherein, at 15 days in culture, the cultured cells produce at least twice as much vanillin as cells cultured 15 days under equivalent conditions but which were not supplemented with the compound.

10. (Twice amended) The cultured *Vanilla planifolia* cells of claim 9, wherein, at 15 days in culture, the cultured cells produce at least ten times as much vanillin as cells cultured 15 days under equivalent conditions but which were not supplemented with the compound.

31. (Amended) A cell culture comprising *Vanilla planifolia* cells, supplemented with an elicitor of vanillin synthesis selected from the group consisting of malic acid, 3,4-dihydroxybenzaldehyde, a combination of malic acid and 3,4-dihydroxybenzaldehyde [citric acid, pyruvic acid, oxaloacetic acid, succinic acid], and glycosylated lysozyme, [and any combination thereof] wherein, after 15 days in culture, the cell culture produces at least twice as much vanillin as cells cultured 15 days under equivalent conditions but which were not supplemented with the elicitor.

32. (Amended) The cell culture of claim 31, which, at 15 days in culture, produces at least ten times as much vanillin as cells cultured 15 days under equivalent conditions but which were not supplemented with the elicitor [wherein the supplementation is of an amount effective to increase the production of vanillin].

Claims 35-40 were canceled.